

REMARKS

This is a resubmission of the amendment filed September 9, 2003 which has been changed only in that an indication that claim 20 had been cancelled previously was been presented, this paragraph has been added, and the date on the last page has been changed. Since an Advisory Action was issued on September 17, 2003 and an RCE was filed on October 2, 2003, both of which are prior to the Notice, it is respectfully requested that this paper be considered a substitute for the RCE submission.

Prior to the present amendment, the claims recited a process in which the second organic solvent having a relative evaporation rate lower than that of the first organic solvent was incorporated into at least one of the first and second mixtures. In order to expedite allowance of this application, the claims have now been limited to the processes in which the second organic solvent constitutes a part of the second mixture.

Claims 1-13 and 17-19 were rejected under 35 U.S.C. 103 over JP '925 in view of GB '211 or Takeuchi, while Claims 14 and 15 were rejected under 35 U.S.C. 103 over the same combination of references in further view of Tokuda. Both of these rejections are respectfully traversed.

Monolithic ceramic electronic components which are formed from a plurality of ceramic layers and which include internal circuit element films have an inherent problem due to the step portions which result from that construction. There is a difference in thickness at points in the part and as the size of the individual layers is reduced, the difference in thickness becomes more apparent. An additional ceramic material has been used to overcome this problem in order to substantially compensate for the spaces defined by the step like sections formed by the internal film on the ceramic sheets. That compensating materials is obtained by applying a ceramic paste containing a ceramic powder, binder, plasticizer and organic solvent. The dispersability of the ceramic powder in the ceramic paste must be high in order to form a printing layer which has both a high

accuracy and a desired thickness such as, for instance, 2 μm or less. The art has developed a number of methods to accomplish this result.

The primary reference in both rejections, JP '925, represents one method of addressing the problem. This reference teaches making a slurry by mixing a ceramic powder, binder and first organic solvent, mixing the resulting slurry with a second organic solvent and then heating the resulting mixture so as to remove one of the solvents. This procedure does improve the dispersability of the ceramic powder to some extent but since the paste contains the organic binder, the viscosity becomes high during the mixing process and that imposes a limitation on the ability to improve the dispersability of the ceramic powder.

The present invention is based on the surprising discovery that the process of JP '925 could achieve a paste of suitable viscosity if the introduction that the binder was delayed until after the primary dispersion of the ceramic powder and the less volatile boiling point organic solvent had been achieved. That is not described in the primary reference and the deficiency is not obviated by the secondary references.

The teachings of JP '925 have been discussed in the present application as well as noted above. As the Examiner has pointed out, it discloses a process of mixing a ceramic powder, binder and first organic solvent followed by adding a second solvent having a higher boiling point and then removing the first solvent. By so acting, the character of the resulting paste becomes the same as the character of the dielectric powder used in the dielectric slurry to form the individual plies of the product, so that the sintering properties of each layer and the thickness adjustment layers become the same. The present invention differs from this procedure in that the binder is not added when a first dispersion is made with the ceramic powder and the first organic solvent and in that the binder and second organic solvent are added together in a later step. As a result, the viscosity of the paste is controlled. There is no teaching or suggestion in JP '925 concerning the control of the viscosity of the paste in the manner claimed. As to claim 6, there is a further difference in

that there is no teaching or suggestion in JP '925 of filtering the secondary dispersion (containing the binder) before the first solvent is eliminated from the composition.

The deficiencies in JP '925 are not cured by the secondary references.

GB '211 relates to method of forming complex shapes with a refractory material by forming slurry of the refractory material, binder, plasticizer and a single solvent. In an example, the refractory material is wet milled with the same solvent used in the slurry before the binder and plasticizer are added. The purpose of the wet milling is to make the refractory material a desired size. The Takeuchi reference has a similar disclosure, as noted by the Examiner. Both of these references show ball milling to break up a material before forming a slurry paste. Both teach using the same solvent as will be present in the paste when used. Neither teaches nor suggests that the late introduction of the binder affects the viscosity of the paste when a two solvent method is employed. Also, nothing in the combination teaches or suggests the filtering of the secondary dispersion before selective removal of the first solvent is begun.

Assuming that one skilled in the art would want to perform wet milling for the reasons advanced in the Office Action, which is a different motivation than in the present invention, then it is contraindicated to mill in the first organic solvent. The paste product of the Japanese reference is a combination of ceramic, binder and higher boiling point solvent since the lower boiling point solvent is driven off. To mill in the solvent desired to be present in the final paste means that the material will be milled in the second solvent. Milling in the low boiling point organic solvent (the first solvent), as in the present invention, does not make logical sense since that means that the milled ceramic would have to be transferred from dispersion in the first organic solvent to the dispersion in the second organic solvent whereas if the milling took place in the second organic solvent, no such transfer would be required. Moreover, the heat generated during milling could result in driving off at least some of the first organic solvent. Thus, even if one were to assume that there was a reason to wet mill before adding the binder in a two solvent process, the wet


milling would take place in the solvent intended to remain in the product at the end of the process, namely the higher boiling point solvent. That is not the claimed process.

The additional reference, Takuda, which has been cited only against claims 14 and 15, does not overcome any deficiency in the combination of JP '925, GB '211 and Takeuchi. Takuda has been relied on only to show an inductor and does not teach or suggest preliminary wet milling in a lower boiling point organic solvent. It's a combination with the other references, therefore, cannot render the claimed invention obvious.

In light of all of the foregoing, it is respectfully submitted that this application is now in condition to be allowed and the early issuance of a Notice of Allowance is respectfully solicited.

Dated: November 6, 2003

Respectfully submitted,

By 

Edward A. Meilman

Registration No.: 24,735

DICKSTEIN SHAPIRO MORIN &
OSHINSKY LLP

1177 Avenue of the Americas
41st Floor

New York, New York 10036-2714
(212) 835-1400

Attorneys for Applicant